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<b>(21) International Application Number:</b> PCT/US98/19420 <b>(22) International Filing Date:</b> 14 September 1998 (14.09.98) <b>(30) Priority Data:</b> 933,164 18 September 1997 (18.09.97) US <b>(63) Related by Continuation (CON) or Continuation-in-Part (CIP) to Earlier Application</b> US 08/933,164 (CON) Filed on 18 September 1997 (18.09.97) <b>(71) Applicant (for all designated States except US):</b> D.W. WALL-COVERING, INC. [US/US]; 12720-A Westport Road, Louisville, KY 40245 (US). <b>(72) Inventors; and</b> <b>(75) Inventors/Applicants (for US only):</b> BRITTON, William [US/US]; 207 Sycamore Hills Court, Louisville, KY 40245 (US). WEINBERG, David [US/US]; 6901 Ridge Run Circle, Prospect, KY 40059 (US). <b>(74) Agents:</b> ROBINSON, Joseph, R. et al.; Darby & Darby P.C., 805 Third Avenue, New York, NY 10022-7513 (US).		<b>(81) Designated States:</b> AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GE, HU, ID, IL, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).  <b>Published</b> <i>With international search report.</i> <i>Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.</i>
<b>(54) Title:</b> REPOSITIONABLE ARTICLE  <div style="text-align: center;"> </div> <b>(57) Abstract</b> <p>This invention provides articles which are capable of being repositioned on a surface while adhering to the surface prior to being bound to the surface. The article, such as a wall covering, has a surface coated with a first adhesive layer (2), and a second slidable spacing layer (3). A method of producing an article is also provided.</p>		

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## **REPOSITIONABLE ARTICLE**

### **Field of the invention**

This invention relates to articles which can be placed on a surface,  
10 repositioned prior to adhesion, and then adhered without the application of additional  
adhesive.

### **Background of the Invention**

Conventional adhesive sheets, such as adhesive wallcovering, are made  
15 from a substrate, such as paper, coated with an adhesive. Positioning such sheets on  
surfaces, however, is often quite difficult because the sheets cannot be moved once they  
initially touch the surface. The adhesive that is conventionally employed prevents such  
movement even after application of only minimal pressure to the sheet.

U.S. Patent No. 3,331,729 describes an adhesive bonding product having  
20 microspheres sparsely, but uniformly, distributed over a pressure sensitive adhesive layer.  
The object containing the adhesive can be positioned on the surface to be adhered to prior  
to pressing against the object to make a firm bond. Similarly, U.S. Patent No. 4,556,595  
describes a pressure sensitive adhesive sheet having non-adhesive solid microparticles  
distributed over the surface of the adhesive layer.

25 Adhesive sheets made according to these patents, however, have no  
adhesive characteristics when initially applied to a surface. They only adhere to the  
surface upon application of substantial pressure, which strongly binds the sheet to the  
surface. The sheet cannot thereafter be repositioned. For this reason, it is very difficult  
for one person to align such sheets.

30 Copending U.S. patent application serial no. 08/744,443, filed November  
8, 1996, discloses removable articles which include a substrate having an adhering surface  
and a non-adhering surface; a base adhesive layer covering at least a portion of the  
adhering surface; and a low tack adhesive layer covering at least a portion of the base  
adhesive layer. The low tack adhesive layer contains an adhesive and microparticles.

Preferably, the microparticles cause the low tack adhesive layer to have a surface for adhering that is not flat. Once the article has been positioned, it can be adhered to the surface by applying sufficient pressure to fracture the microparticles and/or drive the microparticles in the low tack adhesive layer into the base adhesive layer, thereby bringing  
5 adhesive in the base adhesive layer into contact with the substrate's adhering surface. The adhesive in the base layer leaks, or viscously flows, through holes formed in the low tack layer in the spaces previously occupied by the microparticles.

U.S. Patent No. 5,487,929 discloses a repositionable wall covering having a work surface covered with a tacky, discontinuous layer of pressure sensitive adhesive  
10 (PSA). A pattern of projections without adhesive have a height greater than or equal to the thickness of the adhesive is provided within the discontinuities. After the wall covering is placed in the desired location, increased pressure on the decorative side of the wall covering causes deformation of the decorative sheet and/or sufficient compression of the projections to cause a significant area of the PSA to contact the wall surface to provide  
15 final adhesion. The discontinuities in the adhesive layer enable reduced surface contact between the PSA layer and the wall to provide temporary adhesion until a quantity of pressure is applied sufficient to deform the wall covering so a greater surface area of the PSA makes contact with the surface of application.

U.S. Patent No. 5,639,539 discloses a releasable wall covering and method  
20 of manufacture. The wall covering has a reinforcing substrate or backing layer with a surfacing layer formed of a polymer coating overlying a front surface of the backing layer. A layer of printing is applied to the surfacing layer, and a transparent top coat layer extends substantially over the entire printed area. A PSA layer underlies a rear surface of the backing layer to secure the wall covering to the wall, while allowing it to  
25 be repositionable upon installation and releasable after extended use. The pressure sensitive layer contains tacky polymeric microspheres to facilitate easy release of the wall covering from the wall surface.

An object of the present invention is to provide an article containing a surface which is slippable and exhibits a low degree of tack to permit easy movement  
30 during alignment of the article, but thereafter allows the article to be adhered to the surface by application of sufficient pressure.

It is also an object of the invention to provide an article that can be initially positioned by application of a small amount of pressure without strongly adhering the

article to the surface. The article can then be repositioned, if necessary, and subsequently can be strongly adhered.

### **Brief Description of the Drawings**

- 5                    Fig. 1 is a plan view of a slippable adhesive sheet of this invention.  
                    Fig. 2 is a cross-section view of Fig. 1 along the X line.  
                    Fig. 3 is a cross-section of an adhesive sheet of the invention having a  
                    release layer and a peelable layer on the non-adhering surface of the substrate.  
                    Fig. 4 is a cross-section of an adhesive sheet of the invention having a  
10                  release layer and a peelable layer on the adhering surface of the substrate.  
                    Fig. 5 is a cross-section of an adhesive sheet of the invention having a  
                    release layer on the adhering surface of the substrate.  
                    Fig. 6 is a top view of one embodiment of an adhesive sheet of the  
                    invention.  
15                  Fig. 7 is a top view of one alternative embodiment of an adhesive sheet of  
                    the invention.

### **Summary of the Invention**

20                  The present invention relates to an article capable of being repositioned on  
a substrate prior to being adhered to the substrate. The article can either be of the type  
which is removable from the substrate only by wetting, scraping or steaming or which is  
removable from the substrate by other methods. The removable articles include:

- (a) a base layer having a substrate-facing surface and a non-adhering surface;
- 25                  (b) a continuous first adhesive layer which covers the substrate-facing surface of the base layer, the first adhesive layer having a substrate-facing surface and a base layer-facing surface and comprising a first adhesive; and
- (c) a second slidable spacing layer which covers and is non-removably adhered to a portion of the substrate-facing surface of the first adhesive layer,  
30                  the second layer having a substrate-facing surface and a first adhesive layer-facing surface;  
and

wherein a portion of the substrate-facing surface of the second layer extends further, as measured perpendicularly from the base layer, from the base layer than does the substrate-facing surface of the first adhesive layer.

The article is preferably a slippable sheet, such as wallcovering or wall trim, which can be positioned, and aligned, on a substrate before being adhered thereto.

The invention also relates to methods of forming the article, and methods of applying the article to a substrate.

### **Detailed Description of the Invention**

10           The present invention relates to an adhesive system which allows positioning of an article on a surface whereby a non-continuous spacing layer allows easy registering of the article with a desired site of bonding. Once the article has been positioned, it can then be adhered to the substrate by applying sufficient pressure to permit an adhesive from an underlying first adhesive layer to travel through and/or around the  
15   spacing layer or to allow the spacing layer to travel into the first adhesive layer, so that the first adhesive comes into contact with the substrate to which the article is to be adhered.

          The slidable spacing layer preferably also exhibits low peel adhesion. Application of a small amount of pressure to the article containing such a spacing layer  
20   does not cause the article to adhere substantially, and the article can thereafter be easily repositioned.

          The article can be, for example, a sheet, wallcovering, wall trim, mirror panel, lightweight artificial brick, panel, tile, picture, poster, sticker, wall hanging, decorative appliqué, appliance panel, cabinet finish, insulation panel, billboard, display,  
25   or any other article that can be adhered to a surface. Preferably, the article is lightweight. Most preferred articles are wallcoverings, wall trim, and shelf or drawer liners.

          Figures 1 and 2 depict a preferred embodiment of the invention: a slippable sheet which includes a base layer (1) having a substrate-facing surface (6) which will face a substrate to which the article is adhered and a non-adhering surface (5) which will  
30   typically have applied thereto a decorative pattern. Such slippable sheets can be used as, for example, wall covering, wall trim, and liners. Base layers may be made of, for example, paper (including synthetic and natural papers), cloth (including cloths made of synthetic and/or natural materials), films, tape, foil or laminates. The substrate may be

coated with, for example ink, wax, foil, or combinations thereof. Coatings can be used to provide decorative sheets containing printed matter on the non-adhering surface of the base layer material. The base layer may further comprise a sublayer which is disposed between the substrate-facing surface of the base layer and the first adhesive layer. Such base layers may include paper sublayers such as those used in solid vinyl sheet materials.

The base layer can be conventional wall covering base material, such as a coated paper, cloth, or vinyl or other polymeric materials. Such coated materials are well known, the coating being made from e.g., pigment and latex binder. The pigments can be, e.g., clay and calcium carbonate. One commercially sold paper of this type is identified as C2170-084 sold by Monadnock Paper Mills, Inc. (Bennington, NH). The first adhesive layer (2) is disposed between the base layer (1) and the second slidable spacing layer (3). The spacing layer serves to separate all or part of the first adhesive layer from the substrate to which the article will be applied. The slidable spacing layer preferably is a discontinuous, contoured surface for contacting a surface to be adhered to.

A surface, preferably the substrate-facing surface (6) of the base layer (1) is at least partially covered with a first adhesive layer (2) having a substrate-facing surface (7) and a base layer-facing surface (8). The first adhesive layer (2) preferably is continuous and covers the entire substrate-facing surface of the base layer. The first adhesive layer (2) contains adhesive that preferably exhibits high adhesion. Preferably, it exhibits a tack of greater than about 100 g/cm<sup>2</sup> and less than about 300 g/cm<sup>2</sup>. The adhesive is preferably capable of strongly adhering the sheet to the substrate surface to which it is to be adhered. As diluted in the layer, the adhesive preferably exhibits a peel value greater than about 0.5 pounds per lineal inch, more preferably greater than about 1.0 pounds per lineal inch, and most preferably greater than about 2.0 pounds per lineal inch. The adhesive can be removable, for example, by peeling without any treatment. The adhesive can also be a "non-removable" or "permanent" adhesive, only removable by wetting, scraping, or steaming. The adhesive used in the first adhesive layer, as well as in the second adhesive layer if an adhesive is used in the second layer, is preferably a pressure sensitive adhesive. Other adhesives may be used, however. For example, a wettable adhesive might be used which adheres to a wetted surface.

In a preferred embodiment, the adhesive in the first adhesive layer is a hot melt adhesive. This allows the first adhesive layer to be applied evenly to the surface of a sheet-like base layer. The second layer can then be evenly, but discontinuously applied

over the exposed surface of the first adhesive layer of a base layer/first adhesive layer combination.

The first adhesive layer, as well as the second slidable spacing layer, can independently contain rheology modifying agents, antioxidants, tackifiers, adhesives, plasticizers, fillers, or any combination thereof.

The first adhesive layer preferably has a thickness less than about 0.01 inch, more preferably less than about 0.005 inch, and most preferably about 0.001 inch.

The first adhesive layer preferably has a viscosity of from about 2000 cps to about 50,000 cps at 350°F. In a preferred embodiment, the viscosity of the first adhesive layer ranges from about 5,000 cps to about 20,000 cps at 350°F. The viscosity of the first adhesive layer can be adjusted to influence the rate at which the first adhesive layer flows through or around the second slidable spacing layer once pressure is applied to the article.

The second slippable spacing layer has a substrate-facing surface (9) and a first adhesive layer-facing surface (10). The layer covers only a portion of the first adhesive layer. Preferably, it covers greater than 50% of the first adhesive layer. It is discontinuous and can be applied as stripes (Figure 6), islands (Figure 7), or the like. The second slippable spacing stripes, islands, or the like may contain adhesives or may not. If the second layer does not contain adhesive, it may initially allow only a portion, and preferably a minor portion, of the first adhesive layer to contact a substrate to which the article is applied so that only an amount of the adhesive in the first adhesive layer effective to hold the base layer in place for proper registration or placement contacts the substrate before the adhering pressure is applied. However, the second slippable spacing layer can contain an adhesive which may be the same as or different than the first adhesive in the first adhesive layer. Alternatively, a lower tack adhesive can be used in the second layer, if desired. For example, a high tack adhesive, e.g., exhibiting a tack of more than 600 grams, can be used in the second slidable spacing layer but have a lower tack because only a minor amount of adhesive contacts the substrate before application pressure is applied due to the discontinuous nature of this second layer. This results in contact over a small surface area. Preferably, the second slidable layer exhibits a tack of less than about 200 g/cm<sup>2</sup>, more preferably less than about 50 g/cm<sup>2</sup>, and most preferably less than about 5 g/cm<sup>2</sup>.



The adhesive in the second slidable spacing layer preferably exhibits low peel adhesion. This allows the article to be easily repositioned after an amount of pressure is applied which is low enough that the sheet is not substantially adhered to a substrate by the adhesive contained in the first adhesive layer. Preferably, the adhesive  
5 exhibits a peel adhesion of less than about 0.75 pounds per lineal inch, more preferably less than about 0.2 pounds per lineal inch.

The second slidable spacing layer preferably has a Brookfield LV viscosity of between about 800 and about 1500 cps at 25°C uniformly throughout the low tack adhesive layer. The second slidable spacing layer can be collapsible upon application of  
10 pressure to the article or non-collapsible.

The second slidable spacing layer may also contain surfactants such as an alkyl hydroxy alkyne (e.g., Surfynol™ (Air Products, Allentown, PA)), and rheology modifiers such as a methylated hydrocarbon (e.g., Aerosol™ (Cytec, W. Patterson, NJ)).

The thickness of the second slidable layer at any point can vary. The  
15 thickness of the layer, measured at the thickest point, is preferably less than about 0.01 inch, more preferably less than about 0.005 inch.

The adhesives in the first adhesive layer and the second slidable spacing layer, if different from one another, are preferably effectively incompatible so that they do not mix or diffuse into one another to any degree that would destroy the individual  
20 properties of each. In a preferred embodiment in which the second slidable spacing layer includes adhesive, the first adhesive layer is applied as a dispersion of a hot melt adhesive at elevated temperature, such as 350°F. For example, a rubber resin can be used as the hot melt adhesive. The second adhesive is then applied as an aqueous dispersion on top of the first adhesive layer and dried, e.g., in an oven. The two adhesives should not  
25 substantially mix prior to the time that the sheet is applied to the surface to which it is to be adhered. Preferably, the first adhesive layer diffuses less than about 50% into the second adhesive of the second slidable spacing layer, more preferably less than about 20%, most preferably less than about 15%, over a period of two years at room temperature.

30 Conventional pressure sensitive adhesives can be used as both adhesives. These can be chosen from among, for example, acrylic adhesives, and rubber resin adhesives.

Acrylic adhesives include, for example, homopolymers, copolymers or crosslinked copolymers of at least one acrylic or methacrylic component, for example acrylic esters such as methyl acrylate, ethyl acrylate, n-propyl acrylate, isopropyl acrylate, n-butyl acrylate, isobutyl acrylate, tert.-butyl acrylate, amyl acrylate, hexyl acrylate, octyl acrylate, 2-ethylhexyl acrylate, undecyl acrylate or lauryl acrylate, or as a comonomer, a carboxyl-containing monomer such as (meth)acrylic acid, itaconic acid, crotonic acid, maleic acid, maleic anhydride or butyl maleate, a hydroxyl-containing monomer such as 2-hydroxyethyl(meth)acrylate, 2-hydroxypropyl(meth)acrylate or allyl alcohol, an amido-containing monomer such as (meth)acrylamide, N-methyl(meth)acrylamide or N-ethyl(meth)acrylamide, a methylol group-containing monomer such as N-methylol(meth)acrylamide or dimethylol(meth)acrylamide, an amino-containing monomer such as aminoethyl(meth)acrylate, dimethylaminoethyl(meth)acrylate or vinylpyridine, or a non-functional monomer such as ethylene, propylene, styrene or vinyl acetate.

Rubber adhesives include, for example, natural rubber, isoprene rubber, styrene-butadiene rubber, styrene-butadiene block copolymer, styrene-isoprene block copolymer, butyl rubber, polyisobutylene, silicone rubber, polyvinyl isobutyl ether, chloroprene rubber and nitrile rubber.

Pressure sensitive adhesives are preferred. Suitable pressure sensitive adhesives for use in the invention are commercially available. A preferred commercially available pressure sensitive adhesive for use in the low tack adhesive layer is Flexcryl™ 1625 (Air Products Allentown, PA), an acrylic polymer based adhesive. Preferred commercially available pressure sensitive adhesives for use in the base adhesive layer contain Kraton™ D-1107 and Kraton™ D-1102, block copolymers of styrene-butadiene-styrene, styrene-isoprene-styrene, styrene-ethylene-butylene-styrene, and styrene-ethylene-propylene (Shell Chemical Co., Houston, TX). In a particularly preferred embodiment, Kraton™ D-1107 and Kraton™ D-1102 are used in combination.

Permanent adhesives for use in the invention are well known and include adhesives commercially sold as H2179-01 (Findley Adhesives Inc., Wauwatosa, WI) and LHM 2512 (Imperial Adhesives).

Tackifying agents may be added if desired. Such agents are well known in the art. Typical commercially available agents include polyterpenes with ring and ball softening point from 85-115°C, such as AONESTER™ (Arizona Chemical, Panama City,

FL) and PICCOLYTE™ (Hercules, Wilmington, DE) or hydrocarbon resins from the C<sub>5</sub>-C<sub>9</sub> oil refining stream such as ESCOREZ™ (Exxon, Houston, TX) and WINGTACK™ (Goodyear, Akron, OH).

If desired, the surface of the second slidable spacer layer can be covered  
5 with a release layer comprising, for example, a coating containing silicone, a paraffinic material, an over-paint varnish, or a combination of any of the foregoing, or with a peelable release layer, such as silicone coated papers. Such layers are well known in this art. UV 9300 (GE Silicones, Waterford, NY) is one commercially available release layer. Figure 5 shows such a sheet having a release layer (16). In Figure 4, the release layer  
10 is covered by a peelable layer (14).

Similarly, as shown in Figure 3, the non-adhering surface of the base layer, e.g., a printed side of wallcovering, may be covered with a release layer (10) and/or a peelable layer (12). Such layers are conventionally applied, and can act to reduce and stabilize unwind tension.

15 When the article, such as for example a slippable sheet, of the invention is applied to a substrate, the substrate is in contact with the second slidable spacer layer and possibly with a minor portion of the first adhesive layer, i.e. a portion of that layer not covered by the second slidable spacing layer. Suitable substrates include, but are not limited to, walls, shelves, drawers, and the like. The overall low tack of this second layer  
20 allows the slippable sheet to be easily moved or repositioned. If a low degree of pressure is applied, such as normally occurs when pressing with the hand, the second slidable spacer layer may primarily hold the sheet in place while the rest of the sheet is positioned. For example, wall covering having a printed surface can be easily moved to obtain registration of the print pattern. Once the rest of the sheet is finally positioned, higher  
25 pressure can be applied, such as with a squeegee, to allow the pressure sensitive adhesive in the first adhesive layer to adhere strongly the sheet to the surface. The pressure applied, by hand, a squeegee, or otherwise, to a portion of the sheet, usually the top of the sheet, in order to drive the first adhesive layer through and/or around the second slidable spacing layer. Use of a removable adhesive, as opposed to a permanent adhesive,  
30 allows the sheet to be removed without wetting, scraping, or steaming at a later date, if desired.

The slippable sheet of this invention can be made by conventional means. In one manufacturing process, a roll provides a base layer, preferably having a print on

the non-adhering side of the base layer. The base layer is fed through various idler and tensioning rollers, as is well known by those skilled in the art, where a high tack pressure sensitive adhesive material is applied. The high tack adhesive material is dispersed on the substrate-facing side of the base layer. An adhesive application roller or slot die may be used to apply a controlled and evenly distributed amount of the adhesive. Once the high tack adhesive material is applied and has cured, the second slidable spacing layer is conventionally applied over a portion of the substrate-facing surface of high tack adhesive material of the first adhesive layer. A reverse roll is preferred as the coating head in the application process. A wire wound coating head has also been found to be suitable. The second slidable spacing layer is dried prior to use.

### **Description of the Preferred Embodiments**

The present invention is illustrated in the experiments described in the following examples. It should be understood that the invention is not limited to the specific examples or the details described therein.

### **EXAMPLE 1**

Test samples of wallpaper are obtained having a first high tack pressure sensitive base adhesive layer thereon. The first adhesive layer is applied using a hot melt process and has a thickness of about 0.00075 inch. It is applied to the wall covering by slot die coating of the molten formula using a coater produced by the May Company (Minneapolis, MN). The composition of the layer is as follows (all parts by weight):

	Kraton™ D-1107	-	50 parts
	Kraton™ D-1102	-	50 parts
25	Escorez™ 5380	-	60 parts
	Irganox™ 1010	-	1 part
	Shellflex™ 371	-	10 parts
	Super-Pflex™ 2000	-	30 parts

The Kraton™ components are block copolymer elastoplastics adhesives that are further described above. Escorez™ 5380 (Exxon Chemical Co., Houston, TX) is a hydrogenated hydrocarbon tackifying resin. Irganox™ 1010 (Ciba-Geigy) is an antioxidant (having the chemical name tetrakis ([methylene (3,5-di-tert-butyl-4-hydroxyhydrocinnamate)])

methane). Shellflex™ 371 is a naphthenic oil. Super-Pflex™ 2000 (Pfizer Minerals, Pigments & Metals Division, New York, NY) is a surface treated calcium carbonate.

A series of different low tack pressure sensitive adhesives are applied as stripes or islands to the first adhesive layer coated wall paper prepared above. This low  
5 tack layer is applied using a wire wound bar, set to apply a 0.005 inch layer. Acrysol™ 6038A is a polyacrylic acid based thickening agent. Flexcryl™ 1625 is a pressure sensitive adhesive exhibiting a tack of about 600 grams and a shear of 17 hours.

The resulting samples are tested after about 3 weeks. The degree of peel is tested according to ASTM-903, except that a squeegee is to apply pressure. The amount of  
10 tack is tested according to ASTM D-2979. Loss of adhesion is noted as edgelifting or flagging. Edgelifting indicates a minor lifting of the wallpaper that can be measured in millimeters on only one portion of the paper. Flagging is a more significant lifting of the paper that can be measured in inches.

15

### EXAMPLE 2

Four papers containing first adhesive layers are obtained for coating in this experiment. One contains the first adhesive layer described in Example 1. The three others are chosen to cover a range of tack from about 300-700 g/cm<sup>2</sup>. Details on the layers' tack and film thicknesses are shown in Table I.

20

H2179-01 is a permanent adhesive sold by Findley Adhesives Inc., Wauwatosa, WI. LHM 2512 is a permanent adhesive sold by Imperial Adhesives. H2274-01 is a removable adhesive sold by Findley Adhesives Co.

### The Low Tack Coating Formulae

25

Three second slidable, spacing layer adhesive formulae are listed in Table II.

These second slidable, spacing adhesive formulae are coated onto the different papers containing first adhesive layers thereon using a nip-fed reverse roll coating head. The head is set at a gap of up to 4 mils (shimmed). The wet coatings of the T and V formulae are smooth and uniform. Each paper is rolled up on individual cores. The papers are tested  
30 for tack and peel.

TABLE I: HOT MELT PRESSURE SENSITIVE ADHESIVE COATED PAPERS

BASE ADHESIVE	Tack (g/cm <sup>2</sup> )	FILM THICKNESS (mils)		COAT WEIGHT (g/100in <sup>2</sup> )	
		Left	Right	Left	Right
H2179-01	400-500	1.5	1.1	3.07	2.21
LHM 2512	600-700	1.0	0.7	2.33	1.99
Example 1 First Adhesive	Not measured	0.7	0.7	1.77	1.72
H2274-01	300	0.6	0.4	1.96	1.53

TABLE II: LOW TACK ADHESIVE FORMULATIONS (IN GRAMS)

MATERIALS	T	U	V
Deionized Water	1600	1600	1600
Attigel™	320	320	320
Flexcryl™ 1625	4000	4800	4000
Deionized Water	2080	2080	2080
Aerosol™ NPES 2030	560	560	640
% Solids	40.4	44.3	42.3
Viscosity (cps)*	1000	390	1210

\* Brookfield LV with #3 spindle at 60 rpm

All patents, applications, publications, and test methods mentioned herein are hereby incorporated by reference. Many variations of the present invention will suggest themselves to those skilled in this art in light of the detailed description herein. All such obvious variations are within the full intended scope of the claims appended  
5 hereto.



**IN THE CLAIMS:**

1                   1.     An article comprising:  
2                   (a)     a base layer having a substrate-facing surface and a non-  
3     adhering surface;  
4                   (b)     a continuous first adhesive layer which covers said substrate-  
5     facing surface of said base layer, said first adhesive layer having a substrate-facing surface  
6     and a base layer-facing surface and comprising a first adhesive; and  
7                   (c)     a second slidable spacing layer which covers and is non-  
8     removably adhered to a portion of said substrate-facing surface of said first adhesive  
9     layer, said second layer having a substrate-facing surface and a first adhesive layer-facing  
10    surface; and  
11                  wherein a portion of said substrate-facing surface of said second layer  
12    extends further, as measured perpendicularly from said base layer, from said base layer  
13    than does said substrate-facing surface of said first adhesive layer.

1                   2.     An article as defined in claim 1, selected from the group consisting  
2     of an adhesive sheet, wallcovering, wall trim, and a liner.

1                   3.     An article as defined in claim 1, wherein said base layer comprises  
2     a material selected from the group consisting of paper, vinyl, latex, and fabric.

1                   4.     An article as defined in claim 1, wherein said non-adhering surface  
2     of said base layer is coated.

1                   5.     An article as defined in claim 4, wherein said non-adhering surface  
2     of said base layer is coated with a coating selected from the group consisting of ink, wax,  
3     foil, and any combination thereof.

1                   6.     An article as defined in claim 1, wherein at least a portion of said  
2     non-adhering surface of said base layer is covered by a release layer.

1                   7.     An article as defined in claim 4, wherein at least a portion of said  
2     coated non-adhering surface of said base layer is covered by a release layer.

1                   8.     An article as defined in claim 6, wherein said release layer  
2 comprises a material selected from the group consisting of silicone, a paraffinic material,  
3 an over-paint varnish, or a combination of any of the foregoing.

1                   9.     An article as defined in claim 7, wherein said release layer  
2 comprises a material selected from the group consisting of silicone, a paraffinic material,  
3 an over-paint varnish, or a combination of any of the foregoing.

1                   10.    An article as defined in claim 8, wherein said release layer  
2 comprises a peelable release layer.

1                   11.    An article as defined in claim 9, wherein said release layer  
2 comprises a peelable release layer.

1                   12.    An article as defined in claim 1, wherein said first adhesive  
2 comprises a permanent adhesive.

1                   13.    An article as defined in claim 1, wherein said first adhesive is  
2 removable by wetting, scraping, or steaming from a substrate to which said article is  
3 applied.

1                   14.    An article as defined in claim 1, wherein said first adhesive  
2 comprises a removable adhesive.

1                   15.    An article as defined in claim 1, wherein said first adhesive  
2 comprises a pressure sensitive adhesive.

1                   16.    An article as defined in claim 1, wherein said first adhesive  
2 comprises a hot melt adhesive.

1                   17.    An article as defined in claim 14, wherein said first adhesive is  
2 removable by heat from a substrate to which said article is applied.

1                   18.    An article as defined in claim 1, wherein said first adhesive has a  
2   viscosity ranging from about 2000 to about 50,000 cps at 350°C.

1                   19.    An article as defined in claim 1, wherein said first adhesive layer  
2   has a thickness of about 0.01 inch.

1                   20.    An article as defined in claim 1, wherein said first adhesive layer  
2   further comprises a surfactant, a rheology modifier, or a combination thereof.

1                   21.    An article as defined in claim 1, wherein said second slidable  
2   spacing layer is non-adhesive to a substrate to which said article is applied.

1                   22.    An article as defined in claim 1, wherein said second slidable  
2   spacing layer comprises a second adhesive which is the same as or different from said first  
3   adhesive.

1                   23.    An article as defined in claim 22, wherein said second slidable  
2   spacing layer comprises a second adhesive which is different from said first adhesive.

1                   24.    An article as defined in claim 23, wherein said first adhesive and  
2   said second adhesive are incompatible.

1                   25.    An article as defined in claim 24, wherein said first adhesive is  
2   capable of passively diffusing less than 50% into said second adhesive at room  
3   temperature over a period of two years.

1                   26.    An article as defined in claim 25, wherein said first adhesive is  
2   capable of passively diffusing less than 20% into said second adhesive at room  
3   temperature over a period of two years.

1                   27.    An article as defined in claim 1, wherein said second slidable  
2   spacing layer has a thickness of less than about 0.01 inch.

1                   28.    An article as defined in claim 23, wherein said second slidable  
2   spacing layer further comprises a surfactant, a rheology modifier, a tackifier, or any  
3   combination of any of the foregoing.

1                   29.    An article as defined in claim 23, wherein said second adhesive has  
2   a Brookfield LV viscosity ranging from about 800 to about 1500 cps at room temperature.

1                   30.    An article as defined in claim 1, wherein said portion of said  
2   substrate-facing surface of said second layer which extends further from said base layer  
3   is greater than 50% of said layer.

1                   31.    An article as defined in claim 1, wherein said base layer further  
2   comprises a sublayer disposed between said substrate-facing surface of said base layer and  
3   said first adhesive layer.

1                   32.    A slippable adhesive sheet comprising:

2                           (a)    a base layer having a substrate-facing adhering surface and  
3   a non-adhering surface;

4                           (b)    a continuous first adhesive layer which covers said substrate-  
5   facing surface of said base layer, said first adhesive having a substrate-facing surface and  
6   a base layer-facing surface, comprising a hot melt pressure sensitive adhesive, and  
7   exhibiting a peel adhesion of more than 0.5 pounds per lineal inch; and

8                           (c)    a second slidable spacing layer which covers a portion of said  
9   first adhesive layer, said second layer having a substrate-facing surface and a first  
10   adhesive layer-facing surface, comprising a pressure sensitive adhesive, and exhibiting a  
11   peel adhesion of less than about 0.75 pounds per lineal inch, wherein said peel adhesion  
12   exhibited by said second layer is less than said peel adhesion exhibited by said first layer;

13                        wherein a portion of said substrate-facing surface of said second layer  
14   extends further, as measured perpendicularly from said base layer, from said base layer  
15   than does said substrate-facing surface of said second layer; and

16                        wherein said hot melt pressure sensitive adhesive of said first adhesive layer  
17   is capable of diffusing less than about 20% into said pressure sensitive adhesive of said  
18   second layer at room temperature over a period of two years.

- 1                    33.    A method for applying an article to a substrate, said method  
2    comprising:
- 3                    (a)    positioning the substrate-facing surface of said second slidable  
4    spacing surface of an article as defined in claim 1 on said substrate to be adhered to; and
- 5                    (b)    applying sufficient pressure to cause said first adhesive layer to  
6    diffuse through and around said second slidable spacing layer to contact said substrate and  
7    adhere said article to said substrate.

1/3

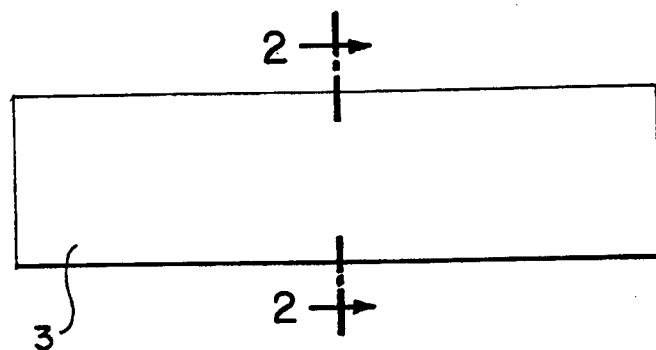


FIG. 1

FIG. 2

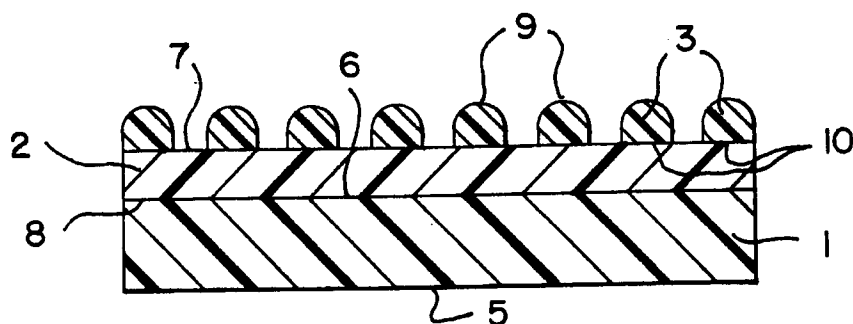


FIG. 3

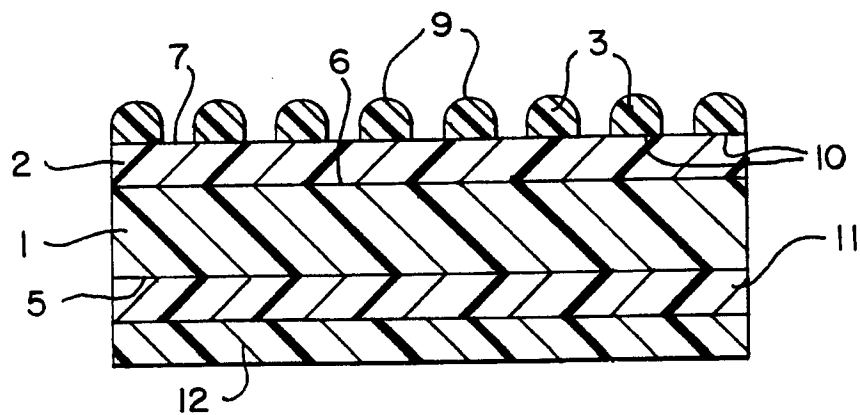


FIG. 4

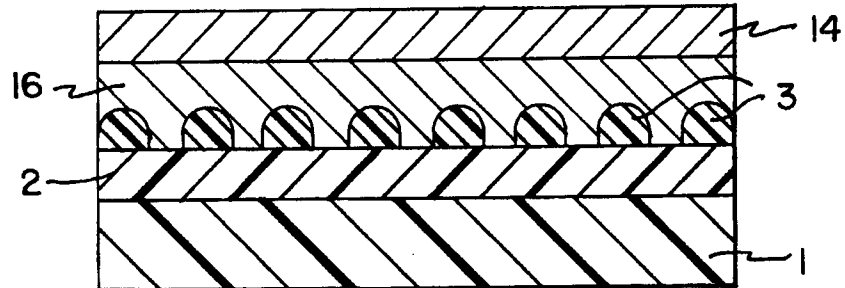


FIG. 5

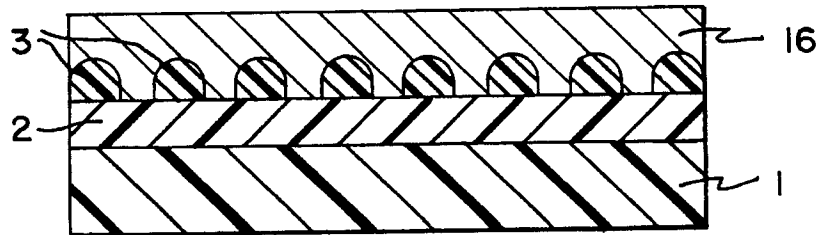


FIG. 6

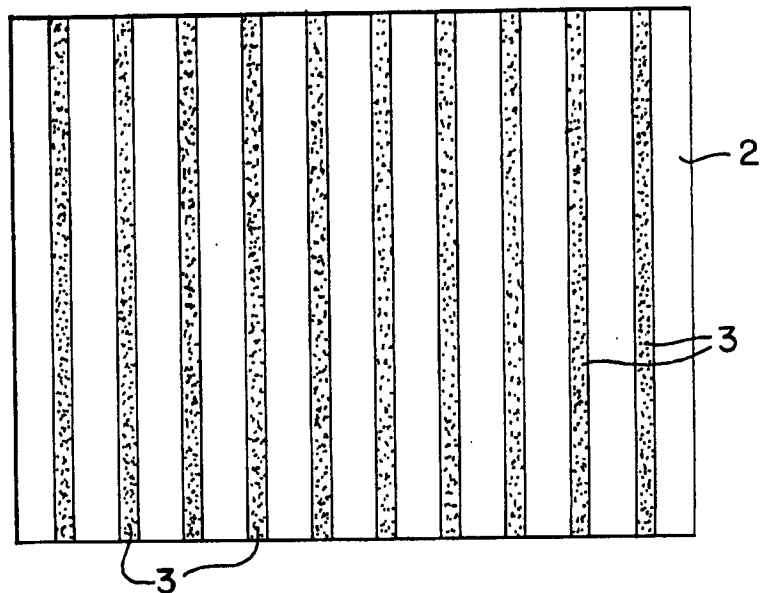
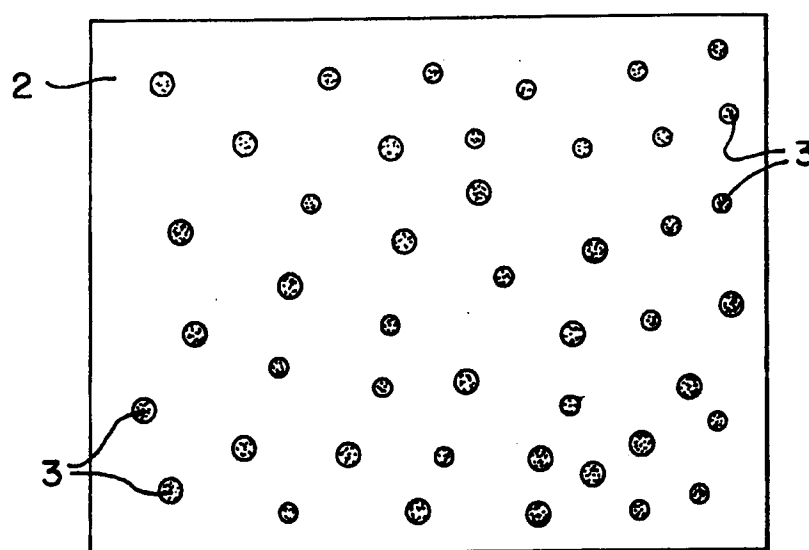


FIG. 7





## INTERNATIONAL SEARCH REPORT

International application No.  
PCT/US98/19420

## A. CLASSIFICATION OF SUBJECT MATTER

IPC(6) : B32B 7/10, 7/12, 7/14, 31/12; A61F 13/02

US CL : 428/40.1, 119, 145, 195, 202, 343, 355RA; 156/283, 290, 291

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 428/40.1, 119, 145, 195, 202, 343, 355RA; 156/283, 290, 291

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

APS, STN

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 5,639,539 A (DePROSPERO et al) 17 JUNE 1997, col. 2, line 45 to col. 4, line 45; col. 4, lines 45-61; and col. 6, lines 25-46.	1-33
Y	US 5,487,929 A (RUSINCOVITCH, Jr. et al.) 30 January 1996, col. 4, lines 35 to col. 5, line 54; col. 6, lines 32-58; col. 7, line 15 to col. 8, line 38; and examples.	1-33
Y,P	US 5,795,636 A (KELLER et al) 18, August 1998, col. 5, line 65 to col. 7, line 8 and examples.	1-33
A,P	US 5,676,787 A (RUSINCOVITCH et al) 14 October 1997, entire document.	1-33



Further documents are listed in the continuation of Box C.



See patent family annex.

* Special categories of cited documents:	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"A" document defining the general state of the art which is not considered to be of particular relevance	"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"B" earlier document published on or after the international filing date	"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"A" document member of the same patent family
"O" document referring to an oral disclosure, use, exhibition or other means	
"P" document published prior to the international filing date but later than the priority date claimed	

Date of the actual completion of the international search

01 DECEMBER 1998

Date of mailing of the international search report

11 JAN 1999

Name and mailing address of the ISA/US  
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Box PCT  
Washington, D.C. 20231

Facsimile No. (703) 305-3230

Authorized officer

H. THI LE

Telephone No. (703) 308-0651

## INTERNATIONAL SEARCH REPORT

International application No.  
PCT/US98/19420

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5,662,758 A (HAMILTON et al) 02 September 1997, entire document.	1-33
A	US 5,346,766 A (OTTER et al.) 13 September 1994, entire document.	1-33
A	US 5,296,277 A (WILSON et al.) 22 March 1994, entire document.	1-33
A	US 5,192,612 A (OTTER et al) 09 March 1993, entire document.	1-33
A	US 5,141,790 A (CALHOUN et al) 25 August 1992, entire document.	1-33
A	US 5,073,457 A (BLACKWELL) 17 December 1991, entire document.	1-33
A	US 5,008,139 A (OCHI et al.) 16 April 1991, entire document.	1-33
A	US 4,735,837 A (MIYASAKA et al.) 05 April 1988, entire document.	1-33
A	US 4,556,595 A (OCHI et al.) 03 December 1985, entire document.	1-33
A	US 3,331,729 A (DANIELSON et al.) 18 July 1967, entire document.	33